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A New Species of Sergestid Shrimp, *Sergia umitakae*
(Decapoda, Sergestidae) from the Indian
Ocean off Sri Lanka

By

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Abstract A new species of sergestid shrimp, *Sergia umitakae*, abundant in the Indian Ocean off Sri Lanka, is described. This species belongs to the *S. challengerii* species group of the genus, which is characterized by having many lens, bearing dermal photophores; it is clearly distinguished from other species of the group by having unique morphology of the male copulatory organ and female exterior sexual organ.

Introduction

The genus *Sergia* STIMPSON, 1860 (Decapoda, Sergestidae) consists of about 30 species. Members are identified mainly by morphological differences of the male copulatory organ, the petasma, and the clasping organ of the lower antennular flagellum (HANSEN, 1919; 1922). The genus contains a number of questionable species because they have been described only from juvenile specimens (*e. g.* KRÖYER, 1859; BATE, 1888) and/or without drawings of the structure of their sexual organ (*e. g.* WOOD-MASON & ALCOCK, 1891; ILLIG, 1914; BURKENROAD, 1940). Many species of *Sergia* are mesopelagic and their rarity hinders progress in taxonomic study of the genus.

On her return cruise of the T/S *Umitaka-Maru*, Tokyo University of Fisheries, from the Persian Gulf to Japan in February 1993 (Cruise No. 55), she encountered a surface aggregation of a new sergestid species at south off Sri Lanka in the tropical Indian Ocean. A total of 1432 specimens, 559 males and 873 females, were collected at about 20 minutes after sunset on February 9th, 1993. The collection was made with a 1 m diam larva net (1 mm mesh size), towed from the side of the ship. This paper describes the characteristics and general morphology of this hitherto unknown species.

Description of new speciesFamily *Sergestidae*Genus *Sergia* STIMPSON, 1860*Sergia umitakae* sp. nov.

(Figs. 1–4)

Material. South off Sri Lanka, Feb. 9, 1993, 1♂ (Holotype, NSMT-Cr 11495, carapace length measured from base of rostrum to posterior edge in dorsal midline of carapace, 10.3 mm), 1♀ (Allotype, NSMT-Cr 11496, cl. 11.1 mm), 5♂♂ (Paratypes, NSMT-Cr 11503–11507, cl. 9.8–10.5 mm), 5♀♀ (Paratypes, NSMT-Cr 11508–11512, cl. 9.8–11.0 mm), 540♂♂ and 860♀♀ (Additional material. Ecological Laboratory, Tokyo University of Fisheries.).

Diagnosis. *Sergia* with firm integument having hepatic spine. Body with lens, bearing dermal photophores. Cornea as long as eyestalk. In male, 4th segment of lower antennular flagellum about 1.5 times as long as 5th. The lobus armatus of petasma short and about 1.5 times as long as broad; lobus accessalis nearly as long as broad. In female, exterior sexual organ with proximal processes on coxa of 3rd pereopods having a half round shape; 6th thoracic sternite with outer slope of anterior protuberances steeper than inner slope; each median protuberance is situated apart from the ventral midline.

Etymology. The new species has been named after T/S *Umitaka-Maru*, the ship from which the specimens were collected on her way home from research and training in Persian Gulf.

Description. Body with dermal photophores having cuticle lens. Carapace approximately half the length of abdomen. Rostrum having a small spinule behind the tooth-like apex, thick and directed forward obliquely from the level of the antero-lateral margin of carapace. Hepatic spine not sharply pointed. The anterior cervical groove is indicated laterally above the hepatic spine, but indistinct dorsally; posterior cervical groove unclear; posterior proximal portion of branchiostegite with 2 rather deep grooves separated by a ridge. Branchiae are visible through branchiostegite: pleurobranchia of 7th thoracic somite 4/5 the length of arthrobranchia of same somite. Inner surface of branchio-cardiac grooves with 4 photophores. Eye reaches approximately 2/3 the length of 1st segment of antennular peduncle; cornea large, as long as distal segment of eyestalk; no orbital spine. 6th abdominal somite longer than telson, ends postero-dorsally in a spinule (Fig. 1). Typical arrangement of photophores on ventral surface is shown in Figure 2A.

Antennular peduncle robust, tapers gradually, and half as long as carapace length; 1st segment with a notch and spinule at middle of outer margin; 3rd segment unarmed at distal-ventral end. Antennal scale with 4 photophores (Fig. 2B). Uropods with photophores 1 on base, 1 on inner ramus and 2 on outer



Fig. 1. *Sergia umitakae* sp. nov., lateral view

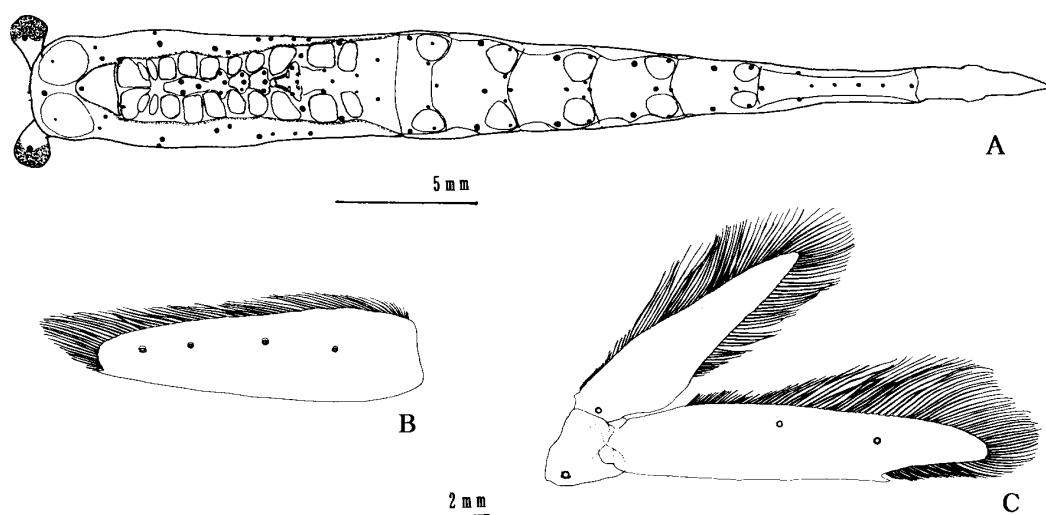


Fig. 2. *Sergia umitakae* sp. nov., pattern of dermal photophores. — A, Ventral surface; B, antennal scale (left), dorsal view; C, uropod (left), ventral view.

ramus (Fig. 2C).

In male, lower antennular flagellum as long as 3rd segment of antennular peduncle; clasping organ forms a chela with 3rd, 4th and 5th segments of lower

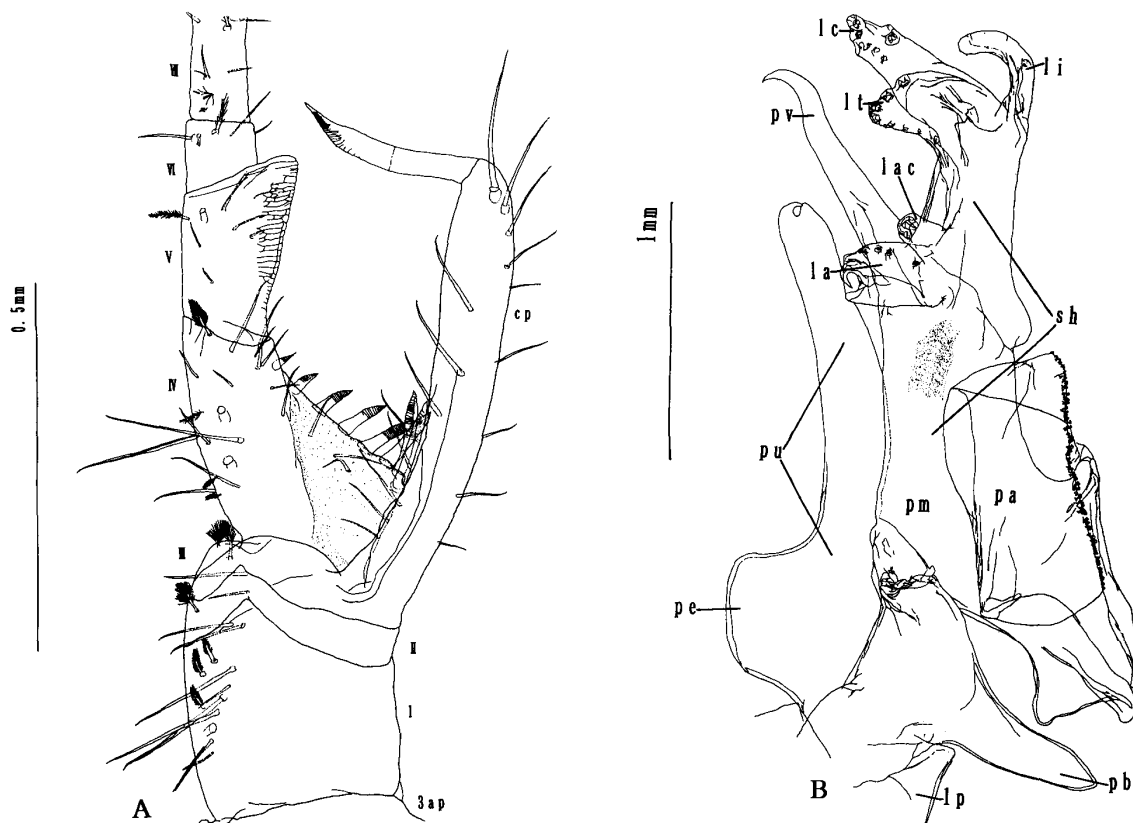


Fig. 3. *Sergia umitakae* sp. nov., male copulatory organ. — A, Clasp organ of lower antennular flagellum (left), ventral view. 3ap, 3rd segment of antennular peduncle; I–VII, 1st to 7th segments; cp, clasp process. B, Petasma (left), dorsal view. lp, 1st pereopod; pb, process basalis; pu, process uncifer; pe, pars externa; pm, pars media; sh, sheath; pv, process ventralis; la, lobus armatus; lac, lobus accessorius; lc, lobus connectens; lt, lobus terminalis; li, lobus inermis; pa, pars astrigens.

flagellum; 1st segment is about twice as long as sum of 2nd and 3rd segments; 4th as long as sum of 1st–3rd segments, and about 1.5 times as long as 5th segment; dorso-external border of 4th segment concave proximally and armed with eight stout spines like a pestle; its distal portion minutely sculptured; 5th segment with sculpture at external border; clasp process of 3rd segment is very long, reaching to the distal end of 5th segment; the distal portion takes the form of a large stout pestle-like spine; lower antennular flagellum composed of 19–20 segments (Fig. 3A).

Petasma with a triangle shape process basalis which elongates posteriorly; process uncifer elongates anteriorly and ventrally; its ventral apex bends dorsally, dorsal apex reaches to tip of the ventral apex. Pars externa, square shape. Process ventralis smooth on surface, tapers, and surpasses the apex of lobus terminalis. Lobus armatus thick, 3.5 times as long as broad; it is 1/3 the length of process ventralis and twice as long as lobus accessorius and is armed with a terminal hook and a number of pits, each with a recurved spine. Lobus

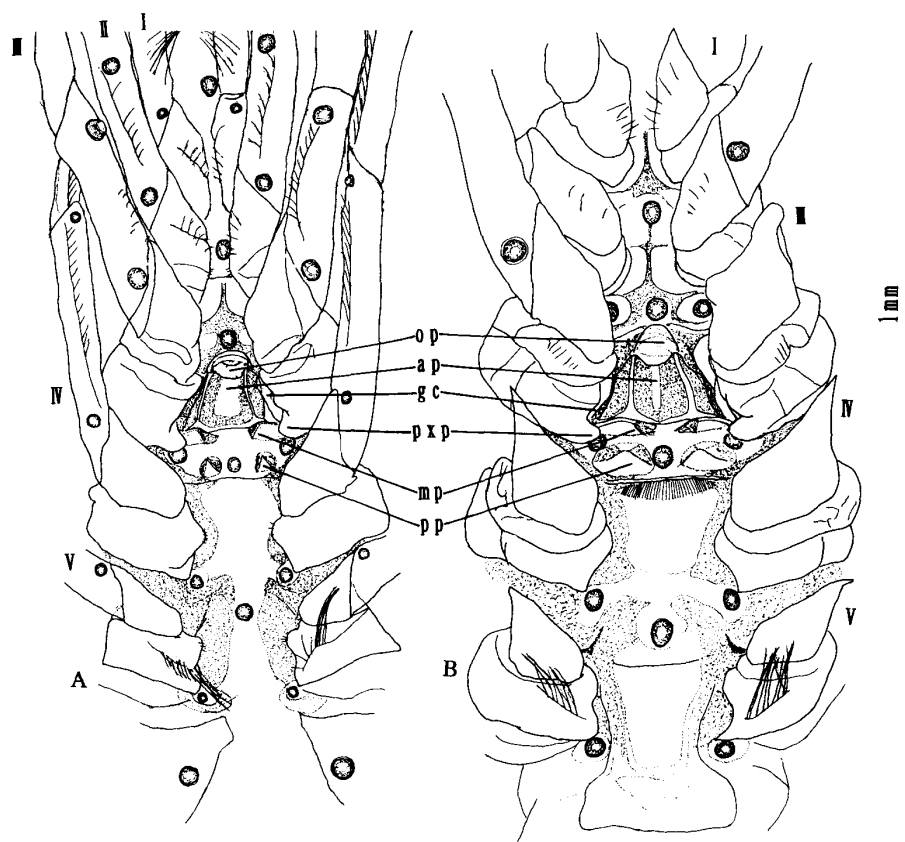


Fig. 4. Female exterior sexual organ, ventral view. — A, *Sergia umitakae* sp. nov. B, *Sergia challenger*. I–V, 1st to 5th pereopods; op, operculum; ap, anterior protuberance; gc, genital cavity; pxp, proximal process; mp, median protuberance; pp, posterior protuberance.

accessorius situated distally from lobus armatus, not sharp on tip, and armed with a terminal retracted hook; lobus connectens with some pits and recurved spines distally, it elongates ventrally and is twice as long as lobus terminalis. Lobus terminalis slightly tapered and inclined with many pits and recurved spines on distal and ventral margin. Lobus inermis curves ventrally, without bifurcated pit on top (Fig. 3B).

In female sexual organ, proximal processes on coxa of 3rd pereopods are a half round shape; median processes degenerated; operculum with a half round shape and slightly swelling; 6th thoracic sternite with anterior protuberances showing a form of two ridges with outer slope much steeper than inner slope; posterior protuberances on 6th thoracic sternite are wart-like (Fig. 4A).

Remarks

The new species belongs to the *S. challenger* species group which is now composed of 8 species (YALDWYN, 1957; VERESHCHAKA, 1994), i. e. *S. challen-*

geri (HANSEN, 1903), *S. fulgens* (HANSEN, 1919), *S. hansjacobi* VERESHCHAKA, 1994, *S. lucens* (HANSEN, 1922), *S. prehensilis* (BATE, 1888), *S. scintillans* (BURKENROAD, 1940), *S. stellata* (BURKENROAD, 1940) and *S. talismani* (BARNARD, 1947). Of the species, *S. umitakae* is most closely related to *S. challengeri* and *S. fulgens* in characters of the pleurobranchia and petasma, but it can be readily distinguished from them by the structure of the male antennule, the lobus armatus of petasma, and the female exterior sexual organ. In *S. umitakae*, the 3rd segment of the antennular peduncle is unarmed distally and ventrally, and the 4th segment of the lower antennular flagellum is about 1.5 times as long as the 5th. In *S. challengeri* and *S. fulgens*, the antennular peduncle is armed and the 4th segment of the lower antennular flagellum is more than twice as long as the 5th. The lobus armatus of *S. umitakae* is short and broad, but slender and tapering in *S. challengeri* and *S. fulgens*. Proximal processes on the coxa of the 3rd pereopods of the female exterior sexual organ are a half round shape in *S. umitakae*, but they are a quarter round shape in *S. challengeri*. The outer slope of the anterior protuberances on the 6th thoracic sternite is also much steeper than the inner slope, and the median protuberances are situated separately in *S. umitakae*, whereas the outer slope is about as steep as the inner slope and the median protuberances are situated closely in *S. challengeri* (Fig. 4B). The latter characteristics of the female exterior sexual organ are not known in *S. fulgens* as we could not examine the type specimens.

Sergia stellata, collected off Sri Lanka during the "Dana" Expedition, is also seen to be allied to *S. umitakae*. The original description of *S. stellata* (BURKENROAD, 1940) is very brief and the holotype, deposited in the Copenhagen Museum, was unavailable to us for comparison, but we feel that *S. stellata* does not agree with *S. umitakae* in the structure of the petasma. The pleurobranchia of the 7th thoracic somite is also nearly 4/5 the length of the arthrobranchia in *S. umitakae*, and is shorter than 1/3 of the arthrobranchia in *S. stellata*.

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